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Kolkwitzia amabilis locally escaped from a long-abandoned homestead in St. Louis County, Missouri

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ABSTRACT. — *Kolkwitzia amabilis*, a small Asian shrub in the Caprifoliaceae known as "beauty bush," is reported escaped from an old planting at an abandoned homestead that has reverted to successional hardwood forest at Tyson Research Center, Missouri. The plant has not been cultivated at the site for at least 80 years, but was observed to have several fruiting adults, many clonal offshoots, and some seedlings. *K. amabilis* is not anticipated to be a major threat to Missouri woodland ecosystems as it has not spread far from the original site of planting in the decades since it was introduced.

INTRODUCTION

Kolkwitzia amabilis (Caprifoliaceae) is a small Asian shrub known as "beauty bush" in the United States and Europe, and "wei shi" (蝟实) in China. Beauty bush lives in temperate climates but can tolerate temperatures down to -29°C (Hortipedia 2024). Gardening websites (Hortipedia 2024) assert that cultivated beauty bush prefers sandy loam or sandy clay soil with a pH between 8 and 10. It thrives in full sun but can tolerate partial shade. *Kolkwitzia amabilis* is rare throughout its native range of central and eastern China and adjacent parts of Mongolia (**Figure 1**). In its native habitat, the flowers are attractive to many nectar-feeding insects, but bees appear to be the primary pollinators (Mao et al. 2015).

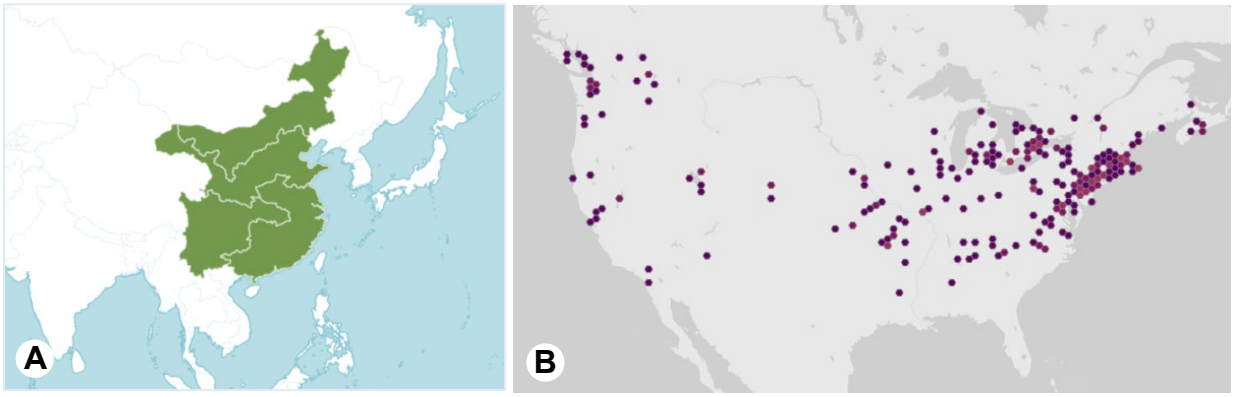

Figure 1. Native range of *K. amabilis*: **A**. in China and Mongolia (Royal Botanical Gardens 2024) and **B**. introduced range in North America (GBIF 2024).

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Beauty bush was discovered by Europeans twice: first by Father Giuseppe Giraldi, a Franciscan monk and Italian botanist working in China 1890-1895, and second in 1901 by Ernest Henry Wilson, who found it while exploring mountains in Ichang, Hubei, China (Arnold Arboretum 2024). Wilson's seed collection made its way to the United States, when it was brought to Harvard's Arnold Arboretum in 1907, but it did not flower there until 1915. Seeds were not brought to the United States from China again until 1994 (Dosmann 2010). The species experienced a boom in cultivation between the World Wars, when it became very popular as an American garden ornamental. The most common cultivars are Rosea, Pink Cloud, Jolene Jolene, and Dream Catcher (Royal Botanical Gardens 2024).

Kolkwitzia amabilis has been documented escaping cultivation in multiple US states, but sources differ on which ones (**Table 1**). Weakley (2024) lists the greatest number of states, at 12: Alabama, Arkansas, Georgia, Illinois, Indiana, Kentucky, Missouri, North Carolina, South Carolina, Tennessee, Virginia, and West Virginia; it is listed as a "waif" in all these states rather than truly naturalized. Collectively, at least one source considers the plant to be naturalized in each of 13 states: Alabama, Colorado, Kentucky, Maryland, Massachusetts, Michigan, New Jersey, New York, Pennsylvania, Utah, Vermont, Virginia, and Wisconsin (**Table 1**). In addition, the Global Biodiversity Information Facility lists 624 occurrences of *K. amabilis* in 35 US states (**Figure 1**; GBIF 2024; note that these records likely include persisting horticultural plantings). Sixteen of those occurrences are found in Missouri, though *K. amabilis* is not included in the Flora of Missouri (Yatskievych 2006) nor noted in any Midwestern state by the Midwest Invasive Plant Network (2022). *Kolkwitzia amabilis* has subsequently been documented in Branson (Taney Co.), where it locally escaped from a garden planting, and has been growing without human care since at least 1998 (Yatskievych 2015).

Table 1. United States distribution of *Kolkwitzia amabilis* (Royal Botanical Gardens 2024; USDA Plants 2024; EEDMapS 2024; Center for Invasive Species and Ecosystem Health 2018; Native Plant Trust 2024; Virginia Botanical Associates 2024).

	States												
Source	AL	CO	KY	MA	MD	MI	NJ	NY	PA	UT	VA	VT	WI
Royal Botanical Gardens	X			X		X		X		X		X	
USDA Plants		X	X	X		X			X	X			
EED					X								X
Invasive.org							X						
Native Plant Trust	X			X		X		X	X		X	X	
Virginia Digital Plant Atlas											X		

Kolkwitzia amabilis Graebn. is also known by the synonym *Linnaea amabilis* (Graebn.) Christenh. While most commonly considered a member of the *Linnaea* clade in the Caprifoliaceae (Reznicek et al. 2011; Royal Botanical Gardens 2024; Wang 2015), the clade is sometimes considered to be its own family, Linnaeaceae (Backlund & Pyck 1998; Bell 2012). The *Linnaea* clade contains six genera: *Abelia*, *Diabelia*, *Dipelta*, *Kolkwitzia*, *Linnaea*, and *Vesalea* (Jacobs et al. 2010; Wang 2015), with *Linnaea* and *Kolkwitzia* being monospecific. Efforts to resolve the phylogeny of the clade led to the proposal of condensing all six of these genera into the *Linnaea*

(Christenhusz 2013). However, more recent molecular studies have concluded that the clade is already monophyletic, and this rearrangement would be unnecessary (Wang 2015).

Kolkwitzia amabilis is a deciduous shrub, usually 1.8-3 m in height. Leaves occur on the upper parts of the thin branches. The leaves are opposite, petiolate, acuminate, basally rounded, pubescent (more densely so abaxially), ranging from 2.5-7.5 cm long and 2-5 cm wide, with nearly entire margins (**Figure 2**). Leaves of adults are distichous, however, the leaves of juvenile plants may be at random angles or decussate. Juvenile leaves have more serrated margins than those of adults. The flowers are light pink, or white with some pink, and have yellow or light orange dots inside the tubular corolla (**Figure 2**). They are 1-2.5 cm long and pubescent, with four stamens and found in axillary pairs (Bailey 1914; Oregon State University 2024; Royal Botanical Gardens 2024). The fruit is a hairy, one-seeded achene. Cultivated plants in Missouri flower from late April to May (Missouri Botanical Garden 2024).

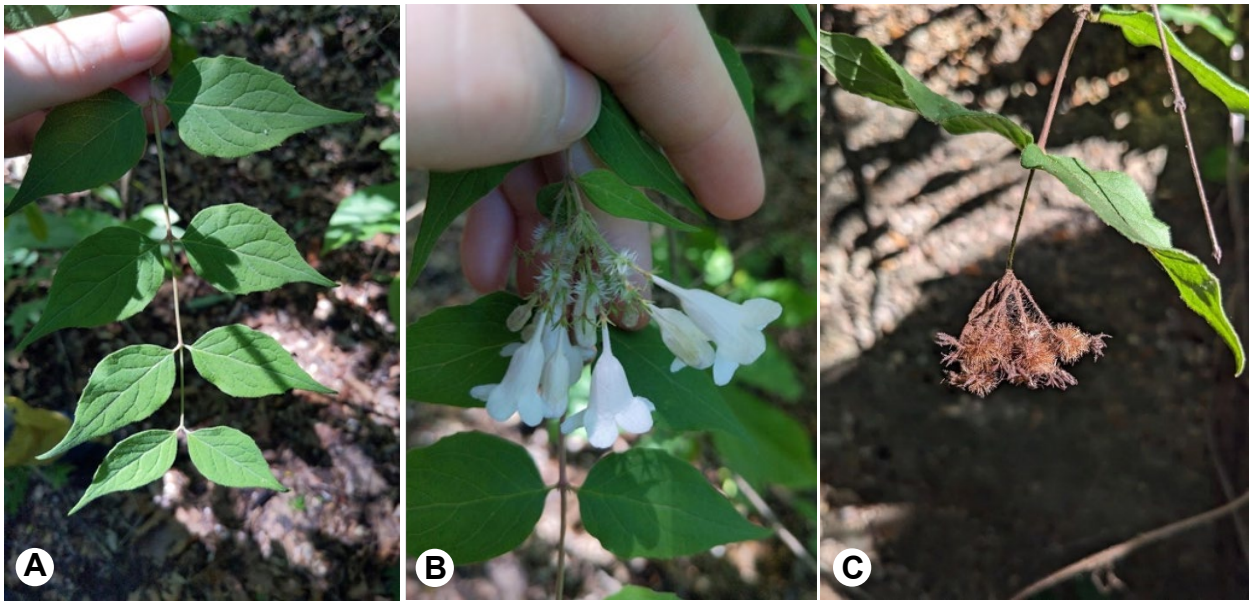

Figure 2. *K. amabilis*: **A**. leaves; **B**. flowers; and **C**. fruits. Photos: Emmett Kearns.

The flowers and fruits are recognizably different from other common Missouri shrubs, but the vegetative material could be mistaken for a honeysuckle species, such as the invasive *Lonicera maackii*. In Yatskievych (2006), *K. amabilis* would key to *Lonicera maackii*, however, the flowers of *K. amabilis* have connate corollas and are actinomorphic, while those of *L. maackii* are zygomorphic and divided. The stamens and style of *L. maackii* protrude from the corolla, while those of *K. amabilis* do not. Finally, the fruits of *L. maackii* are red berries, while those of *K. amabilis* are hairy achenes. Beauty bush is most similar in appearance to cultivated species of *Abelia*, which are part of the same *Linnaea* clade, but *Abelia* has narrow elongate fruits as opposed to the globose fruits of *Kolkwitzia*.

DISCUSSION

We first observed beauty bush on 9 May 2024 while conducting a floristic survey of Tyson Research Center (Tyson), Washington University in St. Louis' environmental field station in St. Louis County. Tyson comprises 2,000 acres on the northern edge of the Ozarks Ecoregion and consists primarily of secondary oak-hickory forest. We found a small population of *Kolkwitzia* associated with the foundations of a previously undocumented homestead. The presence of numerous seedlings confirms that the species has spread past the original planting.

In July 2024 we counted 97 individual *K. amabilis* plants comprising 541 total stems. The plants were grouped into three age classes: adult (>1.3 m tall), sapling (0.5-1.3 m tall), and seedling (<0.5 m tall). There were 23 adult plants with an average of 6.3 stems each and an average DBH (diameter at breast height) of 14 mm (range 1-30 mm). Of these 23 adults, 18 had fruits or evidence of fruiting in 2024. There were 46 sapling class plants with an average of 6.5 stems each, and 28 seedlings with an average of 3.9 stems each. The plants were challenging to distinguish due to spreading underground shoots, with up to a meter between stems, indicating that the plant can spread clonally. Due to the presence of reproductive adults and the location of seedlings, we predicted that at least some of the seedlings germinated from the fruits, in addition to clonal offshoots from the parents, although further excavation of the site would be necessary to confirm this.

The population occurs at mid-slope in a mesic oak-hickory woodland. The canopy was composed of *Acer saccharum* (sugar maple), *Carya* spp. (hickories), *Gleditsia triacanthos* (honey locust), *Sassafras albidum* (sassafras), and *Quercus rubra* (red oak). The site has been overgrown by a dense patch of *Asimina triloba* (pawpaw), shading out most other plants. Notably, while there was a significant amount of the related invasive bush honeysuckle (*Lonicera maackii*) nearby, the *K. amabilis* and *L. maackii* did not overlap in growth. Other associated species included *Ageratina altissima* (white snakeroot), *Andersonglossum virginianum* (wild comfrey), *Euonymus fortunei* (wintercreeper), *Frangula caroliniana* (Carolina buckthorn), *Hackelia virginiana* (Virginia stickseed), and *Parthenocissus quinquefolia* (Virginia creeper).

The ancestors of Tyson's *K. amabilis* population were likely planted between 1920 and 1940, when the species became popular as an ornamental. Plat maps indicate that the land was then owned by David "The Corn King" Ranken (**Figure 3**), a prominent figure in the agricultural history of the Midwest. Ranken (sometimes spelled Rankin) was a prolific landowner, farming 23,000 acres at his peak in 1905 (Schoenfelder & Rankin 2019). He was a national leader in the switch from subsistence farming to industrial agriculture. Ranken was one of the first farmers to incorporate machinery as a way to replace labor (Irwin n.d.). With such a large amount of land, Ranken was almost certainly not managing the land in Tyson Valley himself, and an associate of his likely lived on the property.

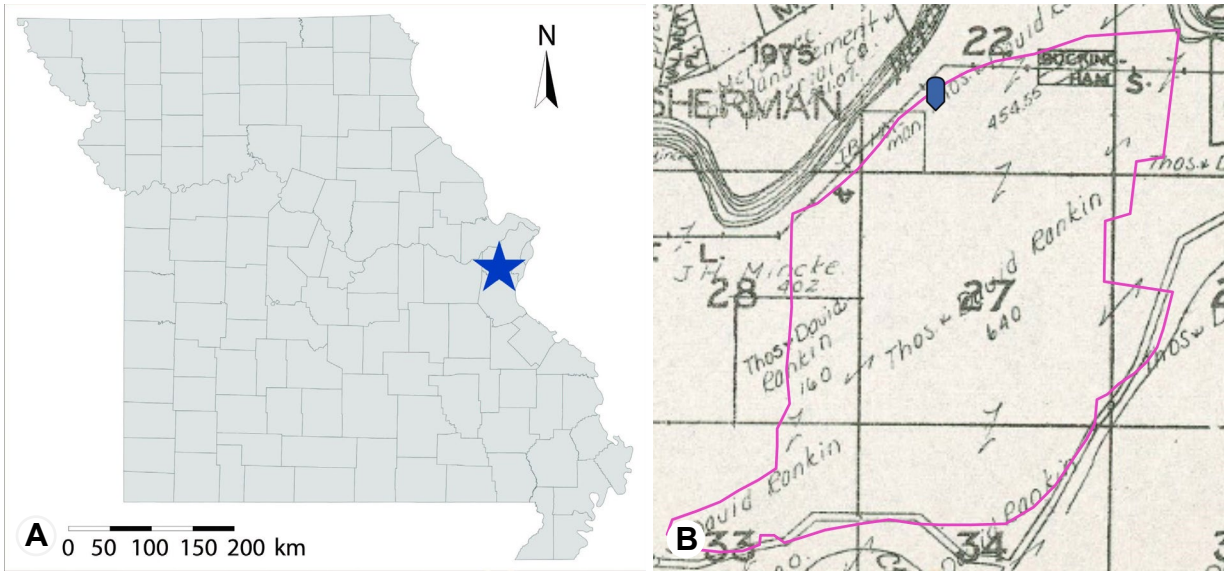

Figure 3. **A**. Tyson Research Center location within Missouri (blue star). **B**. The current Tyson Research Center property (pink outline) on a 1930 Plat Map (Hixson 1930) and the coordinates of the *K. amabilis* discovery (blue point) from the iNaturalist observation.

Historic aerial images show a clearing in the forest at the site of the homestead in 1937 (**Figure 4**). The federal government used eminent domain to purchase the property from Ranken in 1941, but the clearing remained open until 1955 according to historical images maintained by the St. Louis County GIS Center. By 1966, the forest had grown back over the area (**Figure 4**). Military maps from the 1950s do not indicate any activity in that area of the property, so the 1955 clearing is likely a remnant of prior inhabitation (Rushing 1957). We cannot confirm the exact date when the homestead was abandoned, but even if it remained in use until 1941, it has been 83 years between the most recent human caretaking of the beauty bush and its 2024 rediscovery.

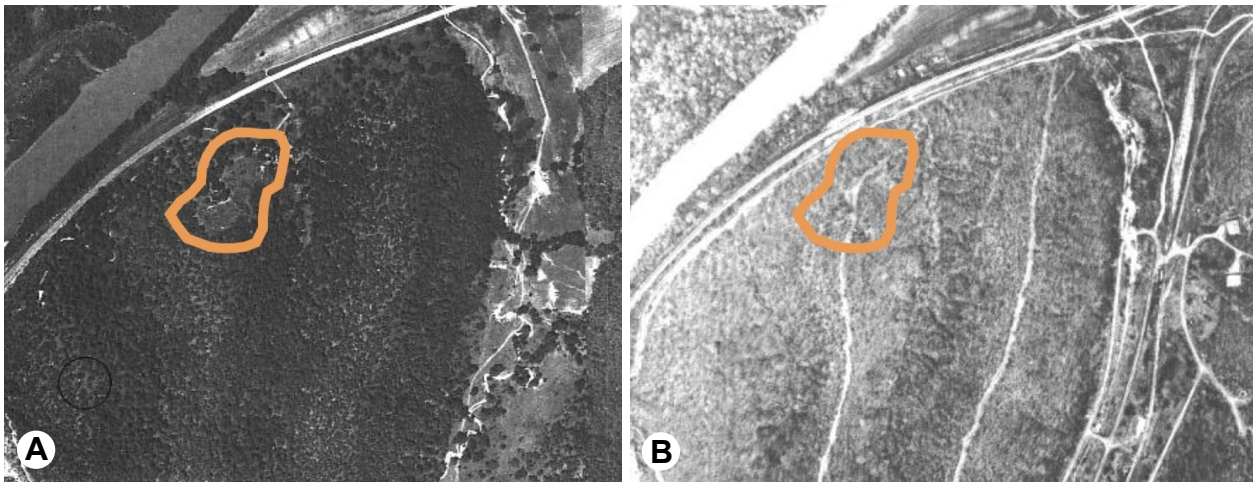

Figure 4. **A**. 1937 Aerial imagery of the clearing. **B**. 1966 aerial imagery of the same area, now forested, except for the road (Saint Louis County GIS Center).

Kolkwitzia amabilis is unlikely to become a problematic invasive in Missouri. It is rare in its native range, uncommon and sporadically distributed in the US, and during the 80 years it was free to expand at Tyson it has only spread a few meters. However, it is possible that it could remain as a relic of other abandoned historic homesteads in the state.

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